

OBUIEN & McCUTCHEON  
OFFICIAL REPORTERS & NOTARIES  
2555 PARK BOULEVARD  
PALO ALTO, CALIFORNIA 94306  
April 18, 1980

(415) 326-9920

ARNOLD, WHITE & DURKEE, ESQS.  
ATTORNEYS AT LAW  
2100 Transco Tower  
Houston, Texas 77056

Attention: Wayne M. Harding, Esq.

Re: BALLY V GOTTLIEB, No. 78G 2246, Our File No. 12688 WV/WV.

Dear Mr. Harding:

Keith Edward Winter has now read his deposition, taken March 6, 1980, in the above matter, requesting the following changes or corrections:

| Page | Line  | Change or correction   |
|------|-------|--|
| 7    | 18    | Delete "a" between "design" and "one"  |
| 7    | 22&24 | Strike the word "kit"  |
| 7    | 28    | " " words "code and"   |
| 13   | 27    | Change "the pace of 16" to "the Pace 16"                                       |
| 16   | 20    | " "Sheet" to "Switch"  |
| 19   | 22    | " "174CPU" to "174 and CPU"  |
| 20   | 3     | " "handed" to "ANDed"  |
| 20   | 13    | " "Nos. 597" to "Nos. 5,9,7"   |
| 20   | 14    | " "No. 138" to "No. 1,3,8"   |
| 21   | 22    | " "RAM" to "ROM"   |
| 21   | 24    | " "RAMs" to "ROMs"   |
| 21   | 25    | " "25204s." to "two 5204s."  |
| 22   | 2     | " "load" to "flow"   |
| 22   | 15    | " "The CPU, it stores out away memory" to<br>"The CPU stores it out in memory" |
| 23   | 1     | Change "Nos. 597" to "Nos. 5,9,7"  |
| 28   | 8     | " "ordered" to "ORed"  |
| 30   | 27    | Delete "visual"  |
| 35   | 23    | Change "second" to "section"   |
| 39   | 25    | " "porject" to "project"   |

These changes have been made to the deposition-original by our reporter-notary and the original transcript will be held in our archives pending filing with the clerk of the court.

Yours very truly,

OBUIEN & McCUTCHEON, INC.

by: Helen S. Preshaw

HSP:mmi

cc: Jerold B. Schnayer, Esq.  
cc: Michael Scherrard, Esq.

IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF ILLINOIS  
EASTERN DIVISION

DOCKETED  
JUL 14 1980

FILED

BALLY MANUFACTURING CORPORATION,  
Plaintiff,

-vs-

D. GOTTLIEB & CO., a corporation,  
and WILLIAMS ELECTRONICS, INC., a  
corporation, and ROCKWELL INTERNATIONAL  
CORPORATION, a corporation,

Defendants.

JUL - 8 1980  
H. STUART CUNNINGHAM, CLERK  
UNITED STATES DISTRICT COURT  
No. 78C-2246

BE IT REMEMBERED that, pursuant to notice and on  
Thursday, March 6, 1980, commencing at the hour of 2:40 P.M.,  
at the offices of NATIONAL SEMICONDUCTOR, 2900 Semiconductor  
Drive, Santa Clara, California, before me, WAYNE WALCOFF, a  
Certified Shorthand Reporter, License No. C 4382, and a Notary  
Public in and for the County of San Mateo, State of California,  
personally appeared

KEITH EDWARD WINTER

who was called as a witness by plaintiff.

**OBUJEN & MCCUTCHEON**  
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I N D E X

Exhibit

Page

GD236 A one-page diagram handwritten by  
Keith Winter . . . . . 12

Examination by:

Mr. Harding . . . . . 3

Mr. Schnayer . . . . . 38

---o0o---

A P P E A R A N C E S

For plaintiff  
Barry  
Manufacturing:

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BY: JEROLD B. SCHNAYER, ESQ., and  
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For defendants  
D. Gottlieb &  
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2100 Transco Tower,  
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For National  
Semiconductor:

MICHAEL SCHERRARD, ESQ.,  
2900 Semiconductor Drive,  
Santa Clara, California 95051

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— 000 —

KEITH EDWARD WINTER

having first been duly sworn by the  
Notary Public to tell the truth, the  
whole truth, and nothing but the truth,  
was thereupon examined and testified as  
follows:

EXAMINATION BY MR. HARDING

MR. HARDING: Q Would you state your name please?

THE WITNESS:     A     Keith Edward Winter.

Q Mr. Winter, you have been designated by National Semiconductor to appear on its behalf pursuant to this notice of deposition designated GD235. The deposition pertains to the development by or for United Games, Inc. in Portland, Oregon of an electronic controller for pinball games, including but not limited to the pinball game OXO. Do you understand that you are designee of National Semiconductor on that topic?

A. Yes.

Q Were you employed on or around 1975?

A With National?

Q With anybody. correct? correct?

A. Yes.

Q With whom?

A National Semiconductor.

Q Are you familiar at all with the electronic controller for pinball games relating to a pinball game called OXO?

OXO?

1 A Yes, I worked on it.

2 Q Now, earlier this morning Mr. Sheridan of National  
3 produced a collection of documents, which have been marked  
4 in an earlier deposition as GD225 through GD228. I'm going  
5 to hand them to you and ask if you've ever seen those docu-  
6 ments before today?

7 A Yes, I have.

8 Q What are those documents to your recollection?

9 A This is a blueprint of the schematics for the pin-  
10 ball machine that we did for United Games.

11 Q Will you please refer to --

12 A That's GD225. GD226 is a flow chart of the driver  
13 program software that ran the pinball machine. GD227 is a  
14 computer printout listing of the software. GD228 is a flyer  
15 or handbill or something that the man from United Games  
16 brought with him in one of his visits.

17 Q Now, do you know in whose files those documents  
18 have been kept before they were given to Mr. Sheridan?

19 A Yes, they were in my files that I kept in the lab  
20 in our department.

21 Q Have those documents been under anybody's control  
22 from the date they were created until present?

23 A How do you mean control?

24 Q Under anybody's responsibility.

25 A Not really. They are just put away as sort of an  
26 archive of projects we had done in the past.

27 Q Are they National Semiconductor documents?

28 A Yes, they are.

1 Q Is it part of your responsibility as a National  
2 employee to preserve National Semiconductor documents?

3 A Try to, yes, on projects. It's not a necessity.

4 Q But were these documents preserved as on your part  
5 pursuant to your employment with National?

6 A Yes.

7 Q Now, would you please look at Document GD225 and  
8 tell me if you recognize the author or authors of those docu-  
9 ments?

10 A I recognize from the handwriting who drew up which  
11 sheets.

12 Q Would you please tell me for Sheet 1?

13 A Sheet 1 was drawn up by Bernie Kute. Sheet 2 is  
14 drawn by Bernie Kute. Sheet 3 was drawn by myself. Sheet 4  
15 looks to be drawn half by myself and half by Bernie Kute.  
16 Sheet 5 was drawn by Bernie Kute. Sheet 6 was drawn by  
17 Bernie Kute.

18 Q Referring to Drawing No. 3, Sheet No. 3, which you  
19 drew, do you recall approximately when you drew that drawing?

20 A I can only go by the date that's on it which is the  
21 26th of June, 1975.

22 Q Do you have any reason to doubt that is not the  
23 date that you drew the drawing?

24 A None whatsoever.

25 Q Do you have any practices in connection with dating  
26 drawings that you complete as to when you affix dates?

27 A I assign a date to it once I've completed the draw-  
28 ing.



1 Q Then it would be according to that practice that  
2 you finished that drawing on or about June 26th, 1975?

3 MR. SCHNAYER: Objection, the question is leading.

4 THE WITNESS: A That would be my practice; I did  
5 finish it on the 26th of June, 1975.

6 MR. HARDING: Q Would you refer to Sheet No. 4?  
7 Can you tell me your recollection as to when you finished  
8 that drawing, the part of that drawing that you drew?

9 THE WITNESS: A That would be again 6/26/75.

10 Q Would you refer now to Drawing GD226. Did you have  
11 any role in the preparation of that document?

12 A Yes. This is all in my handwriting except for this  
13 note on the front. As I recall, the man who wrote the pro-  
14 gram gave me rough copies of the flow chart, which I put into  
15 a neater form.

16 Q Do you recall when you created GD226?

17 A I can't really give you a date since it's not dated.  
18 I would assume it was around the same time.

19 Q Can you refer to any other documents in the stack  
20 to refresh your recollection?

21 A The computer listing of the program I have dated in  
22 my own handwriting, the 16th of July, 1975. I would say the  
23 flow chart was done around that time.

24 Q Do you have any reason to believe that it was not  
25 done around that time?

26 A No.

27 Q When you created Document GD226, did you have any  
28 understanding of the subject matter of that document?



1 A A fairly good understanding, yes.

2 Q Referring to Document GD227, did you have any role  
3 in the preparation of that document?

4 A I don't believe so other than the fact that I may  
5 have run the assembly process.

6 Q Now, you indicated that the date 7/16/75 was in your  
7 handwriting?

8 A Yes.

9 Q Do you recall why you placed that designation on  
10 GD227?

11 A It's common practice once I run a listing of a com-  
12 puter program that I date it and put the time that it was run  
13 for my own reference, to find the most recent copy.

14 Q Did you have any role in the development of an  
15 electronic controller for the OXO game?

16 A Yes, I did.

17 Q What was your role generally?

18 A My role was to design ~~a~~ one module of the system  
19 and also to construct it physically.

20 Q What was that module?

21 A It was a display module and the chip selecting  
22 decoding ~~kit~~.

23 Q Do you know, are the display module and chip  
24 selecting decoding ~~kit~~ shown in GD225?

25 A Yes, they are.

26 Q Can you show me where?

27 A Sheet 3 of GD225 is the display decoder and driver  
28 module. Part of Sheet 4 contains the chip selecting ~~code~~ and

1 logic.

2 Q Is the remainder of the chip selection and decoding  
3 on any other drawing?

4 A No, it's all on here, Sheet 4.

5 Q You indicated that your role was also to construct  
6 something. Can you explain what you mean by construct?

7 A To actually put together the breadboard circuits,  
8 wire it up.

9 Q Was there a technician on the job?

10 A I was acting as technician as well as designing  
11 part of it.

12 Q From your role as technician and part designer, did  
13 you acquire any understanding of the overall operation of the  
14 controller?

15 A Yes.

16 Q Did you become familiar with the construction of  
17 the controller such as any displays or any other hardware  
18 of the controller?

19 A I guess I don't understand.

20 Q Was there any part of the controller that you did  
21 not become familiar with?

22 A No. I have had familiarity with all of the cir-  
23 cuits.

24 Q What is your first recollection of the actions  
25 taken towards commencing the design of an electronic con-  
26 troller for the OXO game?

27 A We were approached by -- I can't remember the man's  
28 name -- somebody from United Games, I think it was -- to

1 design this. He was brought in by one of our field personnel,  
2 and I would say it was sometime in May of 1975.

3 Q I'm handing you a document that's GD229, and ask  
4 you if you have ever seen that document before?

5 A Before today, no.

6 Q Does that document refresh your recollection as to  
7 who approached you from United Games?

8 MR. SCHNAYER: Objection to the question. He said  
9 he's never seen this document.

10 MR. HARDING: Off the record.

11 (Off the record discussion.)

12 THE WITNESS: The name at the top, Frank Johnson,  
13 is the man that we talked to here at National.

14 MR. HARDING: Q Did you personally talk with him?

15 THE WITNESS: A Yes, I did.

16 Q Was this prior to any actual development work on  
17 behalf of your group?

18 A Yes, it was.

19 Q Did the development work commence with any hardware  
20 or game structure provided by United Games?

21 A They provided the box that it was to be housed in  
22 along with the play field itself.

23 Q Now, can you describe what you mean by play field?

24 A The section of the table where the ball rolls  
25 across the switches and actually runs the game.

26 Q Now, if you would refer to GD228, there is obviously  
27 some sort of game apparatus depicted there. Is there any  
28 relation between what is depicted there and what was

1 provided to National during the commencement of this project?

2 A Yes, there is.

3 MR. SCHNAYER: Objection to this question. I don't  
4 believe the witness has ever described that he has seen this  
5 document before.

6 MR. HARDING: Q Can you describe in terms of GD228  
7 what was provided to National?

8 THE WITNESS: A The base of the game and the play  
9 field that you can see under the glass.

10 Q Would you describe what you mean by base?

11 A The white pedestal upon which the game is sitting.  
12 The top portion with red outside that has a slanted plastic  
13 base with bumper cushions on it, that I would call the play  
14 field.

15 Q The play field is a slanted what?

16 A Plastic sheet base.

17 Q Slanted, you mean sloped?

18 A Yes.

19 Q You indicated earlier this has switches on it?

20 A Yes.

21 Q A ball rolls over the play field?

22 A Yes.

23 Q What kind of ball was it?

24 A It was a steel ball, approximately one inch in  
25 diameter.

26 Q Have you ever heard the term pinball?

27 A Have I ever heard the term? Yes, I have.

28 Q Was it a pinball?

1 A Yes, I would say it was.

2 Q Now, I'll give you a piece of paper. Can you  
3 briefly draw, to the best of your recollection, the placement  
4 on the play field of these switches that you have referred to?

5 A There was one switch in the center of the table,  
6 and there were eight switches arranged at the bottom of the  
7 table.

8 Q Can you designate on that sheet of paper some  
9 designation for switches?

10 A The only placement I know of was the one in the  
11 center, which was No. 2.

12 Q Can you draw a circle or something to represent a  
13 switch?

14 A Right here.

15 Q Are there other switches?

16 A Yes, they are eight other switches.

17 Q Can you show those on your drawing?

18 A Yes, they are down here, within a track that fed  
19 them into the switch once they came down to the bottom of the  
20 play field.

21 Q Can you indicate the periphery of the play field in  
22 relation to those switches?

23 A It's a large play field, something like this.

24 Q Was there any other obstacles on the play field,  
25 as you recall, that was given to you from United Games?

26 A There were rubber bumpers placed around the play  
27 field to obstruct the ball's path.

28 Q Can you generally designate those?

1 A Those would be placed somewhere. I have to go by  
2 what's on this piece of evidence here since I can't remember  
3 exactly.

4 MR. SCHNAYER: That was which document?

5 THE WITNESS: GD228.

6 MR. HARDING: Q Do you recall whether there was  
7 any mechanism for propelling the ball onto the play field?

8 THE WITNESS: A There was hand operated plunger.

9 Q Can you indicate that?

10 A That would have been down here.

11 Q Mark that PL or something for plunger.

12 Was there any mechanism for transferring the pinball after  
13 it passed below the row of switches to the plunger?

14 A Yes. There was a solenoid operated device that  
15 kicked the ball to the plunger.

16 Q Is there any way to indicate that on your drawing?

17 A Yes, that would be sitting down here somewhere.

18 Q If you'll mark SOL.

19 MR. HARDING: Now, would you mark that, please.

20 (Whereupon, a one-page diagram  
21 handwritten by Keith Winter was  
22 marked GD236 for identifica-  
tion.)

23 MR. HARDING: Q Do you recall approximately when  
24 this play field structure was provided to National?

25 THE WITNESS: A Well, I would say somewhere  
26 between the beginning and middle of June, 1975.

27 MR. SCHNAYER: Objection to the question, lack of  
28 foundation as to whether this witness would have firsthand



1 knowledge of that.

2 MR. HARDING: Q When was the first time that you  
3 recall seeing the play field?

4 THE WITNESS: A When it was delivered.

5 Q Beginning to mid-June?

6 A Yes.

7 Q Who were any other individuals who had a role in  
8 developing the controller?

9 A Bernie Kute, Milt Schwartz, and Al Weisberger.

10 Q Now, I hand you a document, GD234, and ask you  
11 whether you've ever seen that document before?

12 A Yes, I have.

13 Q What is it?

14 A It's a schematic drawing of a PACE application CPU  
15 card.

16 Q Have you ever had occasion to use the PACE applica-  
17 tion CPU card?

18 A A few times, yes.

19 Q When was the first time that you recall using it?

20 A I would say with this pinball machine was the first  
21 time we used the card.

22 Q That would be the OXO pinball machine?

23 A Yes.

24 Q Can you describe what you mean by a PACE application  
25 CPU card?

26 A Okay. It is a central processing unit computer  
27 board based on the <sup>PACE</sup> ~~pace~~ of 16 bit microprocessor intended  
28 for customer's end applications.

wn

1 Q Is it a general purpose type card?

2 A Yes, it is.

3 MR. SCHNAYER: The question is leading.

4 MR. HARDING: Q Did you have any understanding of  
5 any special purposes which this card was designed for?

6 THE WITNESS: A No, no special purpose.

7 Q What was your understanding?

8 A It is a general CPU board. It can be used in many  
9 different ways.

0 Q Now, you indicated you used the PACE CPU card in  
1 connection with the OXO controller.

2 A Yes.

3 Q Can you now refer to GD225 and relate the structure  
4 depicted therein to the PACE CPU card?

5 MR. SCHNAYER: Objection to the question, lacking  
6 foundation as to whether this relates.

7 THE WITNESS: A The CPU puts out addresses and  
8 data.

9 MR. HARDING: Q Indicating the PACE CPU?

0 THE WITNESS: A The PACE CPU card on its edge  
1 connector, and that plugged into the card, that supported the  
2 controller circuitry for the pinball machine. Those signals  
3 directly drove the circuitry that was on there.

4 Q Now, did the controller involve memory?

5 A Yes, it did.

6 Q Can you identify any memory which was utilized in  
7 the OXO controller by referring to GD225?

8 MR. SCHNAYER: Objection to the question, lacking

foundation.

THE WITNESS: A On Sheet 1 of GD225, it shows the RAM and ROM portions of the memory.

MR. HARDING; Q You did tell me you were familiar with the actual electronic circuitry of the controller; is that correct?

THE WITNESS: A Yes.

Q And you prepared at least Sheet 1 of the drawings, so you are familiar with that?

A No, I didn't prepare Sheet 1.

Q Are you familiar with the circuitry depicted in Sheet 1?

A Yes.

Q How did you become familiar with it?

A Through my education and use on this job.

Q What role did memory play in the OXO controller?

A The ROMs contained the driver software, and the RAMs were used for temporary storage.

Q Now, what do you mean by ROM?

A The read only memory.

Q Is that shown on GD225?

A Yes, it's on Sheet 1. The package location is 1N and 2N.

Q You are pointing to the rectangle designated 5204; is that correct?

A Yes.

Q You referred to RAM. To what does that refer?

A That refers to these four.

Q Can you designate --

A They are 2101 RAMs, package designation 1R, 2R, 4K and 5R.

Q You said the ROM contained driver software?

A Yes.

Q What driver are you referring to?

A The program that allowed PACE to operate the pinball machine.

Q Now, referring to GD236 and the row of switches, do you know whether those switches are designated in GD225?

MR. SCHNAYER: Objection to the question, lack of foundation.

THE WITNESS: A They are shown, eight of them are shown on Sheet 4 of GD225.

MR. HARDING: Q Do you know whether any other switches are shown?

THE WITNESS: A One of them is on Sheet 2 of GD225.

Q Which one is on Sheet 2?

A <sup>Switch</sup>  
~~Sheet~~ No. 2.

MR. SCHNAYER: Continuing the objection, lack of foundation.

MR. HARDING: Q Did you ever have an understanding during this development of the game objective of OXO?

THE WITNESS: A As it was spelled out to us by Mr. Johnson, yes.

Q What was your understanding of the game objective?

A My understanding was that it was a game of chance,

1 and that various results of playing the game paid off I assume  
2 in money.

3 Q What was the game play, if you know?

4 A It was loosely based on tic-tac-toe.

5 Q Can you be more specific?

6 A All right. There are various ways of lighting up  
7 lights in a tic-tac-toe board which paid off different at  
8 different odds.

9 Q What tic-tac-toe board are you referring to?

10 A The display section of the board that's shown in  
11 here.

12 MR. SCHNAYER: You are referring to the document --

13 THE WITNESS: GD228. There is a three by three matrix  
14 shown on the display board.

15 MR. HARDING: Q Did United Games actually give  
16 you the three by three matrix display board?

17 THE WITNESS: A No, they did not.

18 Q Did you ever have a display board at National?

19 A We built one.

20 Q What did you use?

21 A Used standard incandescent light bulbs in a three by  
22 three matrix.

23 Q Is there any relationship between the row of switches  
24 you have shown in GD236 and the operation of the incandescent  
25 bulbs in the three by three matrix?

26 MR. SCHNAYER: Objection to the question.

27 THE WITNESS: A Yes, they are directly related.

28 MR. HARDING: Q Can you explain that relation?

1 THE WITNESS: A When the ball rolled across the  
2 switch, a corresponding light on the display turned on.

3 Q How was that effected in the controller?

4 A I don't understand that.

5 Q Well, I understand how a ball activates the switch.  
6 How did the controller, then, turn on the light?

7 A The CPU senses that a switch had been closed,  
8 determined which switch it was, and lit the correspondingly  
9 numbered light on the display field.

10 Q How did a CPU sense the switch that was closed?

11 A Any switch closure on the play field caused an  
12 interrupt to the CPU, and it then read the switches, and  
13 found out which one had closed, and determined which light  
14 to light from there..

15 Q Can you refer to GD225 and explain in a little more  
16 detail how this interrupt was generated?

17 MR. SCHNAYER: Objection to the question, lacks  
18 foundation.

19 THE WITNESS: A On Sheet 4 of GD225 the switch  
20 matrix is shown.

21 MR. HARDING: Q Can you identify the switch  
22 matrix?

23 THE WITNESS: A It's in the center of the paper  
24 and it's labeled, "Switch Matrix."

25 Q Do you recognize the handwriting of the person who  
26 put "Switch Matrix" on the drawing?

27 A I would say that the switch matrix itself has my  
28 handwriting on it; some of the control circuitry has Bernie



1 Kute's handwriting.

2 Q Well, the term switch matrix itself.

3 A That has my handwriting on it, yes.

4 Q Do you recall why you wrote switch matrix, why you  
5 called that a switch matrix?

6 A For clarity, and because it's in a two by four  
7 matrix.

8 Q Can you explain, then, how the CPU sensed closure  
9 in terms of this switch matrix?

10 MR. SCHNAYER: Objection to the question.

11 MR. HARDING: Q Mr. Winter, you did say you were  
12 familiar with the software and hardware by virtue of your  
13 being a technician and constructing the game and debugging it;  
14 is that correct?

15 THE WITNESS: A Yes.

16 Q Please proceed.

17 A The CPU set the logic in the controller to sense  
18 any switch closure by when a switch closed, an active load  
19 signal was applied to the CPU interrupting No. 3.

20 Q How was that generated through chip selecting  
21 decoding?

22 A No. <sup>174 and CPU</sup>~~174 CPU~~ would leave that in a state that would  
23 sense any switch closure, no matter what the CPU was doing at  
24 the time.

25 Q How would that happen?

26 A Through an interrupt, a closure would drive the  
27 interrupt load.

28 Q Can you explain how that occurred?

1 A Package 3L, two parts of T, and 4M would cause a  
2 logic zero to be sitting on the common connections of the  
3 switch matrix which are then <sup>ANDed</sup> ~~handed~~ together to produce an  
4 interrupt on any switch closure.

5 Q What common connections of the switch matrix are  
6 you referring to?

7 A I have to say 10 and 11, signal No. 10 and 11  
8 coming out of the matrix, which would be wires on the play  
9 field, which are tied together through the logic to produce  
10 the interrupt.

11 Q Can you describe how the switches in each of the  
12 sets in the matrix are interconnected?

13 A Switch Nos. 59,7 and 6 are connected together.  
14 Switch No. 138 and 4 are connected together. Wait a minute --  
15 yes, that's correct.

16 Q Is that one end of the switch?

17 A Those are one end of the switch, normally open  
18 contact.

19 Q What about the other end of the switch?

20 A The other end of the switches are tied through an  
21 AND gate, package No. 6H, to produce an interrupt to the CPU.

22 Q Upon closure of one of the switches, what happens?

23 A Any time a switch is closed, an interrupt will be  
24 produced to the CPU.

25 Q Does that interrupt have a designation?

26 A Yes, it's interrupt Level 3, NIR3.

27 Q That's on Sheet 4?

28 A Yes.

1 Q What happens to NIR3 as shown on Sheet 4?

2 A That is connected onto the PACE CPU application card.

3 Q How is that connected to the PACE card?

4 A Through the edge connector on the card where it  
5 plugged into the controller circuit.

6 Q Referring to GD234, can you indicate that connection?

7 MR. SCHNAYER: Objection to the question, lacking  
8 foundation.

9 THE WITNESS: A The connection is not given a  
10 jumper number. It's on the right side of the print, labeled  
11 BD0 through BD15. And also NIR3 on the left side of the print,  
12 No. 30.

13 MR. HARDING: Q When you say BD0 through 15, are  
14 you referring to the interrupt according to both locations?

15 THE WITNESS: A No, I'm sorry, that was on No. 30  
16 of the edge connector.

17 Q Designated?

18 A NIR3.

19 Q What does the CPU do once it gets a NIR3 interrupt  
20 request?

21 A When it sees the interrupt, it will branch to a  
22 service routine that is in ~~RAM~~ <sup>ROM</sup>.

23 Q Are you referring to --

24 A The ~~RAMs~~ <sup>ROM</sup> that are on the card that we discussed  
25 earlier, package No. 1N and 2N, the ~~25204s~~ <sup>two 5204s.</sup>

26 Q Then what happens?

27 A At that point it executes the program that services  
28 Level 3. In this case, it reads the switch matrix to

1 determine which switch was closed.

2 Q Now, can you refer to the <sup>flow</sup>~~load~~ diagram which you W.W.  
3 said you generated, and refer additionally to Sheet 4, and  
4 describe how this reading takes place?

5 MR. SCHNAYER: Objection to the question, lacking  
6 foundation.

7 THE WITNESS: A These pages aren't numbered.  
8 Page 5 of GD226 is a flow chart of the routine executed by  
9 the CPU to determine which switch was closed.

10 MR. HARDING: Q Now, can you describe how that  
11 routine effects operation of the switch matrix?

12 THE WITNESS: A Okay. It first reads the Scan A  
13 location, which reads half of the switch matrix.

14 Q You say it reads?

15 A The CPU, <sup>it</sup>~~it~~ stores out <sup>in</sup>~~away~~ memory. W.W.

16 Q How does a CPU read the switch information?

17 A It executes a read instruction from that address  
18 location.

19 Q What does that read instruction cause to happen?

20 A It causes to read which switches are closed in the  
21 switch matrix.

22 Q How does it do that?

23 A It produces an address, which corresponds to the  
24 Scan A followed by a read strobe which gates the data into  
25 the CPU from that address location.

26 Q Referring to Sheet 4, upon generation of Scan A,  
27 can you tell me what happens to the switch matrix?

28 A Scan A going low activates Package 3L, one quarter

1 of 3L, which reads switches Nos. 597 and 6, turning them on, w w  
2 and gating them through these buffers 6J onto the CPU's data  
3 bus.

4 Q Does a switch have to be closed before any signals --

5 A No, the CPU will normally read Logic 1 unless a  
6 switch is closed, at which point it will read Logic 0.

7 Q Now, you indicated switch data was stored in memory.

8 A Yes.

9 Q Can you explain that?

10 A When it reads it in, it comes into an internal  
11 register, which it then stores away into a memory location  
12 for later use.

13 Q Where is that memory location?

14 A Somewhere in the RAM.

15 Q Which RAM?

16 A The RAM that's on the controller board, packages  
17 Nos. 1R, 2R, 4K and 5R.

18 Q Is that RAM memory location related to the particu-  
19 lar switches on the play field?

20 A That location is just an arbitrarily assigned  
21 location in RAM for temporary storage.

22 Q Does the CPU know from the particular content of  
23 that storage location which switches, if any, however were  
24 activated?

25 A Yes.

26 Q After Scan A has occurred, what then occurs, if  
27 anything?

28 A Then it runs Scan B, an identical operation, except

that it reads switches Nos. 1, 3, 6 and 4, and stores in memory also.

Q That's in RAM?

A Yes.

Q So at that point, is there a set of memory locations which characterizes all eight switch states?

A Yes.

Q Then does anything further happen?

A Then it goes through a software delay to allow for switch bounce, followed by an identical operation of scanning the switches.

Q Identical to what?

A To the previous scan operation; storing the data in a different location in RAM.

Q What do you mean by switch bounce?

A Mechanical switches, when they close, tend to bounce, giving you multiple closures. In order to accurately read the switches, you must wait until the bouncing stops and you have a good definite switch closure.

Q To your experience, was that a common occurrence in 1975 with switches?

A That always happens with switches.

Q Do you know whose idea it was to put in a software delay and follow up with a second set of scans?

MR. SCHNAYER: Objection to the question, lacking foundation.

THE WITNESS: A For this particular application?

MR. HARDING: Q Yes.



THE WITNESS: A It was Al Weisberger.

Q How do you know that?

A The fact that he wrote the program and had seen the program.

Q After the software delay and the second scan was implemented in the controller, did you ever personally observe any problems associated with switch bounce in the OXO game?

A No.

Q Now, if you would refer to GD236, I would like you to describe a three ball game play sequence, relating the operation of the CPU through the lamps, to the scoring display, and to the operation of the switch matrix, including the Scan A Scan B sequence.

MR. SCHNAYER: . Objection to the question, lacking foundation.

MR. HARDING: Q How many balls were in this program to account for?

THE WITNESS: A I believe it was three.

Q Did you ever play the game?

A When we were testing it, yes.

Q Will you please describe the sequence.

A When the game was begun, by pressing the play switch.

Q What play switch are you referring to?

A That's on the front of the cabinet labeled here, the yellow switch.

Q You are referring to GD228?

A Yes. It's a yellow push button, which activated the game. After that, the CPU through the ball kicker

1 solenoid, slid a ball to the plunger, which operator would  
2 then pull back and shoot the ball into the play field, and  
3 the ball would then roll down across the play field, and  
4 sooner or later pass over a switch or possibly two, depending  
5 if it came through No. 2 switch; at which time the CPU would  
6 sense a switch closure through the interrupt Level 3, scan  
7 the switch matrix using Scan A and Scan B lines, and deter-  
8 mine which switch was closed. It would then light the  
9 corresponding light on the three by three matrix.

10 Q What is it?

11 A The CPU, and the ball would then come down into the  
12 ball kicker, and it would then kick the ball out again to  
13 become ball No. 2. Operation of the plunger would then put  
14 the ball back on the play surface to come down through another  
15 switch or possibly the same switch. The CPU would again scan  
16 the switch matrix as before, lighting the appropriate lights.  
17 The ball would be kicked back and the third ball would be the  
18 last operation, which the player would then shoot the ball  
19 onto the play surface. The CPU would sense the switch closure,  
20 and scan the matrix to find out which one it was, and illumin-  
21 ate the appropriate light on the play field, at which point the  
22 game would be over.

23 Q So, for every ball that was shot onto the play field,  
24 there would be a sequence of Scan A Scan B, Scan A Scan B  
25 applied to the switch matrix; is that correct?

26 A That's correct.

27 MR. SCHNAYER: Objection to the question as leading.

28 MR. HARDING: Q This sequence would repeat for the

1 second ball and once again for the third ball?

2 THE WITNESS: A That's correct.

3 MR. SCHNAYER: Objection to the question, leading.

4 MR. HARDING: Q Tell me what repetition would  
5 there be if there would be any repetition between the Scan A  
6 Scan B, Scan A Scan B sequence of the first ball and such a  
7 sequence for a second ball, and such a sequence for a third  
8 ball?

9 THE WITNESS: A If I understand you correctly,  
10 the operation is identical each time a ball closes a switch.

11 Q So it's repeated?

12 A Repeated, yes.

13 Q Have you ever heard the term cycle applied to  
14 scanning the switch matrix?

15 A No.

16 Q After the Scan A data had been run into its RAM  
17 location and Scan B data had been run into its RAM memory  
18 location, then you performed the second Scan A and Scan B,  
19 what would happen to that data?

20 A If you performed the pair a second time?

21 Q Yes.

22 A The earlier data would be lost.

23 Q I'm referring now to the Scan A Scan B, Scan A Scan  
24 B sequence for bounce.

25 A Yes.

26 Q Scan A was read into memory. Scan B was read into  
27 memory. Then you perform a second Scan A?

28 Yes.

1 Q What happens to that data?

2 A That goes into another memory RAM location.

3 Q What happens to the second B?

4 A The same thing.

5 Q So you have four RAM locations of data?

6 A Yes.

7 Q Then what happens?

8 A Those are <sup>Ordered</sup> ~~ordered~~ together logically within the  
9 computer to determine if it was an actual switch closure or  
10 if it was simply noise that somehow got into the system. If  
11 it was, it would exit the routine and wait for another inter-  
12 rupt. If the data was the same for both in each Scan A and  
13 Scan B, then the CPU would test to find out which switch was  
14 closed, and light the corresponding lights on the display  
15 field. .

16 Q Did there ever come a time in your mind when you  
17 considered the development completed?

18 A For our part, it was completed when Mr. Johnson  
19 drove down here from Portland, picked up the machine, and  
20 took it back.

21 Q Do you recall approximately the date that that  
22 happened?

23 A I can only say it was after the latest date on the  
24 software, which was the 16th of July, '75.

25 Q Relatively speaking, was it shortly thereafter?

26 A It was shortly thereafter.

27 MR. SCHNAYER: Objection, lack of foundation.

28 MR. HARDING: Q What do you base your recollection

h.w

1 on that it would be shortly after that date?

2 THE WITNESS: A Simply that I remember that the  
3 machine was not around. We did not keep it around very long  
4 after we completed the project.

5 Q Now, you indicated that you had played the game  
6 during the development project. Did you form any conclusions  
7 as to how satisfactorily the game played?

8 A It was performing satisfactorily as per the require-  
9 ments. It met his requirements.

10 Q Mr. Johnson came down to pick up the game. Do you  
11 recall him performing any tests on the game?

12 A I believe he played it a couple of times to verify  
13 that it worked properly.

14 Q How did you know that this was the reason that he  
15 was playing the game?

16 A That's an assumption on my part.

17 Q Did he then accept the game and take it away from  
18 National?

19 A Yes, he did.

20 MR. SCHNAYER: Objection to the question, lack of  
21 foundation.

22 MR. HARDING: Q How to know Mr. Johnson took the  
23 game away from National?

24 THE WITNESS: A Because I helped him carry it to  
25 his car.

26 Q Have you ever heard of the term multiplexing?

27 A Yes, I have.

28 Q By 1975, had you heard of the term multiplexing?

1 A Yes, I had.

2 Q By 1975, on this project, had you formulated an  
3 opinion of the meaning of the term multiplexing?

4 A Yes, I had.

5 Q What was your opinion?

6 A What my opinion was is if you are talking about  
7 displays, it was a matter of time, slicing the display informa-  
8 tion up so that you went through one digit followed by the  
9 next until you finished all the digits, coming back to start  
10 all over again. It's a matter of putting information on the  
11 data bus to be read in by the CPU, different pieces of the  
12 information at different times where it's assembled internally.

13 Q The signals representative of the switch states  
14 produced in response to Scan and Scan B, were they communi-  
15 cated to the PACE CPU via the data bus you just referred to?

16 A Yes, they were.

17 Q Did you ever form an opinion in 1975 whether those  
18 signals were multiplexed on the data bus?

19 A Yes, they were.

20 Q Did you ever form an opinion as to whether or not  
21 these switch signals were time multiplexed in sequence on the  
22 data bus when they were being returned to the PACE CPU?

23 A Yes, they were.

24 Q Did this sequence repeat for the second and third  
25 ball of every game?

26 A Yes, it did.

27 Q Was the PACE CPU a visual processor?

28 A Yes, it is.



1 Q Are you familiar with the particular switches which  
2 were referred to in GD236?

3 A How do you mean familiar?

4 Q Did you ever observe the structure and operation of  
5 the switches?

6 A Well, it was a microswitch with a long activating  
7 arm on it.

8 Q When the pinball would engage a switch, what would  
9 be the operation?

10 A When the ball came down across the switch, it would  
11 press the arm down making a switch closure. Once the ball  
12 was off the arm, the switch would then open.

13 Q The ball contacted the arm?

14 A Yes.

15 Q The arm was connected to the switch?

16 A Yes.

17 Q The switch is what is shown on Sheet 4 as being  
18 scanned by the PACE CPU?

19 A Yes.

20 MR. SCHNAYER:

Objection to the question as leading.

21 MR. HARDING:

22 Q Do you recall observing anyone  
23 else playing the OXO game prior to Mr. Johnson taking it from  
24 National?

25 THE WITNESS:

26 A I believe Bernie Kute played it a  
27 few times. Several of the technicians in the lab played with  
28 it. I think that's all.

Q Do you recall the general time period it took for  
the controller to be developed from when you first received

1 the game structure from Mr. Johnson, approximately?

2 MR. SCHNAYER: Objection to the question, lacking  
3 foundation.

4 THE WITNESS: A Approximately four to six weeks.

5 MR. HARDING: Q Do you recall the time period  
6 between the occurrence of a Scan A signal and the occurrence  
7 of the next Scan B signal?

8 THE WITNESS: A Well, it would have been a matter  
9 of two or three instructions executed by the CPU, which I  
10 would say would be between 20 and 25 microseconds.

11 Q How do you know that?

12 A By the fact that the read operation would take some  
13 amount of time, followed by a store operation into memory,  
14 followed by the next read operation, Scan A and a store,  
15 Scan B and a store.

16 Q Do you know whether or not this time interval was  
17 constant for the second scan sequence?

18 MR. SCHNAYER: Objection to the question, lacking  
19 foundation.

20 THE WITNESS: A It would be the same.

21 MR. HARDING: Q Do you know the time interval  
22 between the first sequence of Scan A Scan B signals and the  
23 second sequence of Scan A Scan B signals?

24 MR. SCHNAYER: Objection to the question.

25 THE WITNESS: A No, I don't know the exact amount  
26 of time.

27 MR. HARDING: Q Do you know approximately? Would  
28 the flow chart or the other listing help you refresh your

recollection?

THE WITNESS: A. Yes, I could probably look at it and figure it out.

MR. SCHNAYER: For the record, I believe the witness is examining GD226, and I will request that he make it clear.

THE WITNESS: GD226, Page 5 again and GD227, Page 3, delay constant -- no, I take that back.

MR. SCHNAYER: I would request that he be asked what portions of the exhibit he's looking at.

THE WITNESS: I'm looking at Level 3, interrupt service routine of GD227, source code lines 359 and between 359 and 380. It would be approximately five milliseconds delay between the first and second operations of Scan A and Scan B.

MR. HARDING: Q. Would that delay be the same or different from the delay during the second ball?

THE WITNESS: A. No, it would be the same.

Q. How about the third ball?

A. The same, the program executes the same service routine for each interrupt.

Q. Now, you talked about the ball kicker solenoid.

A. Yes.

Q. To what extent, if any, did the PACE CPU control operation of that solenoid?

A. The CPU used one of its hardware flag outputs through interface circuitry to energize the solenoid by doing a set flag instruction.

Q. Will you refer to Document 225 and explain that operation in terms of hardware?

MR. SCHNAYER: Objection to the question, lacking foundation.

THE WITNESS: A Okay. On Page 6 of 225 the interface circuitry between the flag output from the CPU and the ball kicker solenoid is shown.

MR. HARDING: Q What are you referring to, which circuit?

THE WITNESS: A It's the lower circuit of the three high voltage interface circuits shown on this page.

Q Where is the signal generated from that eventually arrives at the circuit you are referring to?

A The flag that is produced by the CPU comes onto the card from these designations through an optoisolator and through another amplifier, two other amplifiers, to control a 28 volt solenoid.

Q Can you refer to another drawing and indicate the flag that you are referring to?

A GD234, the flag is shown coming out on -- I'm not sure which flag it is here; either in 22, 21 or 24.

Q Is there any way you can tell?

A Yes, I can find out which flag is used.

MR. SCHNAYER: You are again referring to the software, GD227?

THE WITNESS: Yes.

MR. SCHNAYER: Again, Mr. Harding, I request that you ask him to testify as to what lines he's looking at to make that determination.

THE WITNESS:

From the software listing, Flag 14 from

1 the CPU was used to activate the ball kicker solenoid.  
2 Buffer Flag 14 comes out on Pin 23 shown on GD234.

3 MR. HARDING: Q To your recollection, did the  
4 ball kicker solenoid have to be maintained energized for any  
5 given period of time?

6 THE WITNESS: A Yes, there was a certain amount  
7 of time to make sure that it kicked the ball all the way  
8 out before it was turned off.

9 Q Do you recall how that -- how that time period was  
10 guaranteed?

11 A It was through a software delay.

12 Q Can you explain that?

13 A The CPU would set the flag, do a delay, and then  
14 clear the flag. When the flag is clear, the solenoid would  
15 be deenergized.

16 Q Do you recall approximately the amount of time of  
17 that delay?

18 A I would have to figure it out again. Referring to  
19 GD227, approximately 20 milliseconds.

20 MR. SCHNAYER: Mr. Harding, I request that you ask  
21 the witness to testify to the portions of the software, which  
22 lines.

23 THE WITNESS: All right. GD227, the <sup>section</sup>~~second~~ of the  
24 code that activates the ball kicker is between source Lines  
25 153 and 157.

26 MR. SCHNAYER: Thank you.

27 MR. HARDING: Q Can you just briefly relate the  
28 interconnection of the data bus from the CPU card to the

1 memory that you testified to and to how the data bus on the  
2 CPU card produced signals to initiate scanning of the switch  
3 matrix and to receive scan signals in return?

4 MR. SCHNAYER: Objection to the question, lack of  
5 foundation.

6 THE WITNESS: A Referring to GD225, Sheet No. 1,  
7 the data bus is connected from the CPU card.

8 MR. HARDING: Q Where is that connection on the  
9 CPU card?

10 THE WITNESS: A That is on GD234, the connection  
11 shown on the right side of the drawing, BD0 through BD15,  
12 which are connected to the controllers shown on Sheet 1 of  
13 GD225 also indicated BD, in this case BDI0 through BDI15.  
14 Connected from here to here.

15 Q - Go ahead.

16 A The data bus from the CPU card is connected indir-  
17 ectly to the memory.

18 Q By what terminals?

19 A By the same terminals that came from the CPU card.  
20 BDI0 through BDI15 comes directly into the memory, and would  
21 also come into the address latches shown on GD225, Sheet 4.

22 Q What connections, if any, are made to the A0  
23 through A7 inputs on the RAM circuits?

24 A They are connected from the address latches shown  
25 on Sheet 4 of GD225.

26 Q Do you know which AD signals are applied to the A0  
27 through A7 address terminals on the 2101 RAM?  
28 Yes, AD0 is applied to A0. AD1 is applied to A1,

1 et cetera.

2 MR. SCHNAYER: What page is that?

3 THE WITNESS: GD225, Sheet 1 and Sheet 4 show the  
4 connections.

5 MR. HARDING: Q What are the connections to the  
6 ROMs 5204?

7 THE WITNESS: A A0 through A8 on the ROMs are  
8 connected to AD0 through AD8 from the address latches shown  
9 on Sheets 1 and 6 of GD225 -- 1 and 4, I'm sorry.

10 Q How is the switch matrix scanned?

11 A The switch matrix, the CPU applies an address to  
12 the controller card. The addresses are latched by the  
13 address latches shown on Sheet 4.

14 Q Designated what?

15 A On GD225, the package designations are different.  
16 They are 74174s and 74175s. The addresses are latched and  
17 applied to the 74154 address decoder. If trying to scan Scan  
18 A, it will produce an output on Pin 1, which is applied  
19 through the logic of the switch matrix to perform the Scan A  
20 read operation. That data, when the read strobe is applied,  
21 comes out on BD0 through BD2 and BD15.

22 Q What happens?

23 A That data is then accepted by the CPU in an internal  
24 register.

25 Q How does it accept the data, on what terminals?

26 A It's accepted on BD0 through BD15 of the edge  
27 connector.

28 Q Now, if you would look at each page individually of

1 GD225, and tell me from your understanding of the actual hard-  
2 ware implementation of the controller for OXO whether that  
3 respective page of GD225 accurately describes that portion of  
4 the controller, and if it doesn't, then tell me how it differs  
5 to your recollection?

6 MR. SCHNAYER: That's according to his understanding,  
7 counsel; is that correct?

8 THE WITNESS: A To the best of my recollection,  
9 the print in GD225 accurately reflects the system as we gave  
10 it to Frank Johnson.

11 MR. HARDING: I have no further questions.

12 MR. SCHNAYER: Let's take a break.

13 (Whereupon, a short recess was taken.)

14 EXAMINATION BY MR. SCHNAYER

15 MR. SCHNAYER: Q I show you a copy of the document  
16 which has been marked in this litigation GD236. Do you  
17 recognize that to be the document that you've just drawn?

18 THE WITNESS: A Yes, it is.

19 Q When a ball is ejected onto the play field that's  
20 represented by this document of the OXO game, in order to  
21 exit the play field, does the ball have to go over one of the  
22 eight switches?

23 A Yes, it has to go over.

24 Q So this drawing is really not correct?

25 A That's not correct. It does have to cross at least  
26 one switch.

27 Q To your understanding, were any products of  
28 National Semiconductor ever sold to United Games for use in



1 pinball machines manufactured by United Games?

2 A I would have no way of knowing.

3 Q Did you ever hear anybody talk about that?

4 A I don't recall, because I don't get involved in the  
5 marketing aspects.

6 Q Did you ever see an OXO game produced by United  
7 Games which contained a controller, which you had been in-  
8 volved with?

9 A No, I never saw it.

10 Q Did you ever hear anybody discuss the fact that  
11 they had seen a controller?

12 A No.

13 Q That's of course besides the one that you helped  
14 design.

15 A Yes.

16 Q Prior to your participation in designing the con-  
17 troller for the OXO pinball game, were you aware of the  
18 existence of any solid state pinball machine?

19 A Before that, no.

20 Q Prior to the completion of the project, were you  
21 aware of the existence of any other pinball machines?

22 A No.

23 Q Were you aware of work by other people who were  
24 working on a solid state pinball machine prior to the com-  
25 pletion of your <sup>project</sup> ~~project~~?

26 A Not that I ever heard of, no.

27 Q What was your experience with the pinball machines  
28 prior to your working on the OXO project?

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1 A My only experience was as a consumer, playing the  
2 machines.

3 Q Did you ever take one apart?

4 A No.

5 Q You never saw the inside of one?

6 A No, not before I saw this one.

7 Q To your understanding, were there any other  
8 employees that worked for United Games besides Mr. Johnson?

9 A He's the only one I met. He had an assistant with  
10 him when he came down. I think it was his secretary or some-  
11 thing, when he picked the machine up.

12 Q Do you know if it was a she?

13 A Yes.

14 Q Do you know her name?

15 A No, I can't remember the name.

16 Q Have you ever been out to United Games?

17 A No.

18 Q Do you know anything about the company?

19 A No, other than the machine we designed for them.

20 Q Do you know whether the company is in existence  
21 today?

22 A No. That was the last I heard of it.

23 Q After the game was delivered to Mr. Johnson, did  
24 you ever talk to him about the game?

25 A No.

26 Q Did you ever discuss the fact of whether he had  
27 called back and discussed the game with anybody?

28 A Not to my recollection, no.

1 Q Do you have any understanding of what a stand alone  
2 game is?

3 A I've never heard the term.

4 Q Referring to the schematics, GD225, six pages of  
5 schematics, I believe you testified previously that there  
6 were some optoisolators used in the circuits.

7 A Yes, that's correct.

8 Q Could you point out to me where those optoisolators  
9 are contained, and tell me the page number, and tell me which  
10 type of devices are they used with.

11 A Okay. GD225, Sheet 2, there was one optoisolator  
12 shown on the upper left corner. The part number is not listed.  
13 I'm pretty sure it was a NCT200 manufactured by National.

14 Q What was that used for?

15 A That was used for a power fail detect. Also on  
16 Page 5 of GD225 there are optoisolators shown between the  
17 CPU and the incandescent lamps again indicated as NCT200s.  
18 Also Sheet 6, GD225, there are three more optoisolators  
19 shown, NCT200s, between the CPU and the solenoids.

20 Q That's all of the optoisolators?

21 A Yes.

22 Q Do you know what the purpose of using the opto-  
23 isolators was?

24 A Mainly to isolate the CPU from the noise generated  
25 by that high voltage circuitry. The solenoids tend to make  
26 a lot of noise when they are activated, which could cause  
27 trouble to the CPU.

28 Q Do you know how it was determined that these parts

1 should be used in the design, the optoisolators?

2 A They are used because they were the only optoisolators that National used at the time, and they wanted to use  
3 proprietary products.  
4

5 Q Why was an optoisolator used?

6 A To eliminate the noise generated by the solenoid.

7 Q Did somebody make a determination that there would  
8 be noise that would be present, and that these would correct  
9 the problem?

10 A I believe Milt Schwartz did, since he had worked  
11 with that type of circuitry before.

12 Q How did you know that Milt Schwartz made that deter-  
13 mination? What do you base that answer on?

14 A I remember him saying so.

15 MR. SCHNAYER: That concludes my cross-examination  
16 of the witness. Thank you.  
17  
18

19 Keith Edward Winter  
20 Keith Edward Winter

21 Subscribed and sworn to before me  
22 this 7TH day of APRIL, 1980.

23 Sandra R. Miller  
24 Notary Public in and for the

25 County of SANTA CLARA,

26 State of CALIFORNIA.

